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APPLICATION NO		FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
09/942,245		08/29/2001	Tongbi Jiang	2421.1US (99-0408.1)	8370	
24247	7590	09/09/2004		EXAM	EXAMINER	
TRASK BRITT				IM, JUNGHWA M		
P.O. BOX 2550 SALT LAKE CITY, UT 84110				ART UNIT	PAPER NUMBER	
				2811		
			DATE MAILED: 09/09/2004			

Please find below and/or attached an Office communication concerning this application or proceeding.

		Application No.	Applicant(s)			
		09/942,245	JIANG, TONGBI			
	Office Action Summary	Examiner	Art Unit			
		Junghwa M. Im	2811			
 Period for	The MAILING DATE of this communication at Reply	appears on the cover sheet with t	he correspondence address			
THE M - Extens after S - If the p - If NO p - Failure Any re	PRTENED STATUTORY PERIOD FOR REFIALLING DATE OF THIS COMMUNICATION ions of time may be available under the provisions of 37 CFR IX (6) MONTHS from the mailing date of this communication, period for reply specified above is less than thirty (30) days, a received for reply is specified above, the maximum statutory perior to reply within the set or extended period for reply will, by statically received by the Office later than three months after the mail patent term adjustment. See 37 CFR 1.704(b).	N. 1.136(a). In no event, however, may a reply lepty within the statutory minimum of thirty (30 od will apply and will expire SIX (6) MONTHS tute, cause the application to become ABAND	be timely filed) days will be considered timely. from the mailing date of this communication. ONED (35 U.S.C. § 133).			
Status						
1) 🖂 🗜	Responsive to communication(s) filed on 14	June 2004.				
· · · · · · · · · · · · · · · · · · ·		his action is non-final.				
3)□ \$	Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under <i>Ex parte Quayle</i> , 1935 C.D. 11, 453 O.G. 213.					
Dispositio	on of Claims					
5)□ (6)⊠ (7)□ (Claim(s) 1-16,19-24,26-41 and 44-49 is/are a) Of the above claim(s) is/are withd Claim(s) is/are allowed. Claim(s) 1-16, 19-24, 26-41 and 44-49 is/are Claim(s) is/are objected to. Claim(s) are subject to restriction and	rawn from consideration.				
Application	on Papers					
9)[] T	he specification is objected to by the Exami	iner.				
10) The drawing(s) filed on is/are: a) accepted or b) objected to by the Examiner.						
,	Applicant may not request that any objection to t	he drawing(s) be held in abeyance.	See 37 CFR 1.85(a).			
	Replacement drawing sheet(s) including the corr					
•	he oath or declaration is objected to by the	Examiner. Note the attached Of	nice Action of form PTO-152.			
_	nder 35 U.S.C. § 119					
a)[cknowledgment is made of a claim for foreid All b) Some * c) None of: 1. Certified copies of the priority documed. 2. Certified copies of the priority documed. 3. Copies of the certified copies of the priority documed application from the International Bureate the attached detailed Office action for a light	ents have been received. ents have been received in Appli riority documents have been rec eau (PCT Rule 17.2(a)).	cation No eived in this National Stage			
Attachment(•	,, -				
2) Notice 3) Inform	of References Cited (PTO-892) of Draftsperson's Patent Drawing Review (PTO-948) ation Disclosure Statement(s) (PTO-1449 or PTO/SB/NO(s)/Mail Date		nary (PTO-413) ail Date nal Patent Application (PTO-152)			

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8, 10-12, 14-16, 20, 21, 23, 24, 26-28, 30-33, 35-37, 39-41 and 45-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada et al. (US 5,864,178), hereinafter Yamada.

Regarding claims 1-3, 6-8, 10-12, 14-16, 20, 21, 23, 24, 26-28, 31-33, 35-37, 39-41 and 45-49, Fig. 58 of Yamada shows a semiconductor assembly comprising:

a semiconductor device (or a die; 201) having an active surface having a plurality of bond pads (224);

a substrate (202; a wiring circuit board) having an upper surface having a plurality of circuits;

a plurality of bumps (203) connecting said plurality of bond pads on said active surface of said semiconductor device to said plurality of circuits on said upper surface of said substrate;

said plurality of bumps forming a gap between said semiconductor device and said substrate;

an underfill material (encapsulation resin; col. 56, lines 20-26) to fill the gap between said substrate and said semiconductor device (or between the substrate and the wetting agent layer);

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a wetting agent layer of about a monolayer thick, said wetting agent layer wettable by a polymeric material (207, 208) provided on the active surface of said semiconductor device and on a upper surface of substrate (col. 56, lines 22-63 and col. 17, lines 53-59); and said wetting agent including silane (col. 56, lines 29-63).

Regarding claims 5 and 30, Yamada discloses the wetting agent layer reduces surface tension of the active surface throughout the specification especially in col. 20, lines 34-65.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 9, 13, 19, 22, 29, 34, 38 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada in view of Wong et al. (US 6,180,696), hereinafter Wong.

Regarding claims 4, 9, 13, 19, 22, 29, 34, 38 and 44, Yamada shows substantially the entire claimed structure except a specified wetting material. Wong discloses ethyltrimethoxysilane as a wetting material for an underfill process applied for a flip chip packaging. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the teachings of Wong for the wetting layer of Yamada in order to have to good adhesion between chips and substrates, therefore reducing a surface tension in-between as taught in a portion of col. 15, lines 18-22 of Wong's reference.

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Response to Arguments

Applicant's arguments filed June 14, 2004 have been fully considered but they are not persuasive.

- 1. Applicant argues that "The silane coupling agent [of Yamada] is only used in the formation of the encapsulation resin itself, not separately applied to either the semiconductor chip or the wiring circuit." Examiner disagrees. First, it is pointed that the instant claim recites "a wetting agent layer ... wettable by a polymeric material" and the wettable agent layer is formed of silane which is resin. With this understanding, starting in column 56, line 22, Yamada explicitly discloses that a polymer film (207, 208) is formed on the semiconductor chip and on the wiring circuit board. And this polymer film has wettability to the resin (col. 17, lines 53-58).
- 2. Regarding the argument on 35 U.S.C. 103 rejection based on Estes in view of Wang, it is pointed that the rejection should have been written as being unpatentable over Yamada in view of Wong. However, all the detailed further statement clearly recited Yamada. Therefore, it should be understood that the rejection is based on Yamada in view of Wang.
- 3. Applicant further argues that "The Wong reference does not teach or suggest the use of a silane coupling agent as part of the epoxy base polymeric composition." However, Wong discloses ethyltrimethoxysilane (silane based material) as a wetting material for an underfill process applied for a flip chip packaging (col. 15, lines 18-22).
- 4. In response to Applicant's argument that there is no suggestion to combine the references of Yamada and Wong, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. In re Nomiya, 189 USPQ

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607 (CCPA 1975). However, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA1971). References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ 595 (CCPA) 1969.

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Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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